

UNITED STATES DISTRICT COURT
NORTHERN DISTRICT OF CALIFORNIA
SAN JOSE DIVISION

REGENTS OF THE UNIVERSITY OF
MINNESOTA,

Plaintiff,

v.

LSI CORPORATION, et al.,

Defendants.

Case No. 5:18-cv-00821-EJD

**ORDER DENYING MOTION FOR
JUDGMENT ON THE PLEADINGS
THAT THE ASSERTED CLAIMS ARE
PATENT INELEGIBLE UNDER 35
U.S.C. § 101**

Re: ECF No. 190

Before the Court is the motion for judgment on the pleadings filed by Defendants LSI Corporation and Avago Technologies U.S. Inc. (collectively, “LSI”). They seek a finding that the patent claims asserted in this matter are unpatentable under 35 U.S.C. § 101. After LSI’s motion was fully briefed, the Court stayed this matter pending *inter partes* review (“IPR”). ECF No. 211. Upon conclusion of the IPR proceedings, the parties filed supplemental briefs addressing the effect of those proceedings on LSI’s motion. Having considered the parties’ filings, the Court finds LSI’s motion suitable for decision without oral argument under Civil Local Rule 7-1(b). For the reasons that follow, the Court DENIES the motion.

I. BACKGROUND

A. Factual Background

Plaintiff Regents of the University of Minnesota (“UMN”) is a public university that supports and facilitates the research of its professors and students in a wide array of fields. First Am. Compl. (“FAC”) ¶¶ 4–6, ECF No. 40. To fund those efforts, UMN sometimes patents and commercializes the inventions created by its researchers. *Id.* ¶ 8.

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On January 12, 1999, the U.S. Patent and Trademark Office issued Patent No. 5,859,601 (the “’601 Patent”), titled “Method and Apparatus for Implementing Maximum Transition Run Codes.” *Id.* ¶ 46. The ’601 Patent was invented by Dr. Jaekyun Moon, then a professor at UMN, and Dr. Barrett J. Brickner, then one of Dr. Moon’s graduate students. *Id.* ¶¶ 48, 53. The two inventors assigned the ’601 Patent to UMN. *Id.* ¶ 73.

UMN alleges that the ’601 Patent generally relates to a coding scheme for hard disk drives (“HDDs”) known as a Maximum Transition Run (“MTR”) code. *Id.* ¶ 47. As UMN explains, HDDs store digital information by magnetizing regions of a rotating disk. *Id.* ¶ 32–33. To read back data stored on the disk, a read head senses the magnetic fields from the various regions on the disk and converts that information into an analog signal. *Id.* ¶ 39. A sequence detector then interprets that signal, translating it into binary data consisting of 1s and 0s. *Id.* ¶ 40. However, errors can occur during this process due to the presence of noise in the analog signal, including noise generated by the presence of “transitions” that occur when the magnetic polarization changes as the read head moves from one region of the disk to the next. *Id.* ¶¶ 38, 43–44. The problem of noise from transitions is amplified as the data capacity of an HDD increases: increased data capacity leads to an increased density of transitions, and that, in turn, leads to increased noise. *Id.* ¶ 45. According to UMN, the ’601 Patent addresses the problem of noise by eliminating long runs of consecutive transitions with an MTR code, thereby reducing the error rate. *Id.* ¶ 70.

B. Procedural History

UMN initially filed this action in the District of Minnesota on August 25, 2016. ECF No. 1. The case was subsequently transferred before this Court on February 8, 2018, ECF No. 145, and LSI filed the instant motion approximately one month later. ECF No. 190 (“Mot.”). The parties finished briefing the motion on April 27, 2018. ECF No. 201 (“Opp’n”); ECF No. 210 (“Reply”). However, the parties also simultaneously briefed LSI’s motion for stay pending IPR, and on May 11, 2018, the Court granted the motion to stay without deciding the motion for judgment on the pleadings. ECF No. 211.

After protracted litigation that involved two separate appeals to the Federal Circuit, the
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IPR proceedings concluded on August 11, 2022, when the Federal Circuit affirmed the decision of the Patent Trial and Appeal Board (“PTAB”) finding claim 13 of the ’601 Patent to be unpatentable while concluding that claims 14 and 17 of the ’601 Patent were not shown to be unpatentable. *LSI Corp. v. Regents of the Univ. of Minn.*, 43 F.4th 1349 (Fed. Cir. 2022). Shortly thereafter, on October 7, 2022, the Court lifted its IPR stay upon stipulation of the parties. ECF No. 218. The parties then filed supplemental briefs addressing the effect of the IPR proceedings on LSI’s § 101 motion. ECF No. 250 (“LSI Suppl. Br.”); ECF No. 252 (“UMN Suppl. Br.”).

II. LEGAL STANDARD

A. Federal Rule of Procedure 12(c)

A party may move for judgment on the pleadings under Rule 12(c) to challenge the legal sufficiency of the opposing party’s pleadings. *Samsung Elecs. Co. v. Blaze Mobile, Inc.*, ___ F. Supp. 3d ___, 2023 WL 3510380, at *2 (N.D. Cal. May 16, 2023) (citation omitted). Such motions are “functionally identical” to Rule 12(b)(6) motions, and courts accordingly apply the same standard for both. *Gregg v. Haw., Dep’t of Pub. Safety*, 870 F.3d 883, 887 (9th Cir. 2017) (quoting *Cafasso v. Gen. Dynamics C4 Sys., Inc.* 637 F.3d 1047, 1054 n.4 (9th Cir. 2011)). Consequently, courts evaluating a Rule 12(c) motion must “accept factual allegations in the complaint as true and construe the pleadings in the light most favorable to the nonmoving party.” *Manzarek v. St. Paul Fire & Marine Ins. Co.*, 519 F.3d 1025, 1031 (9th Cir. 2008). Courts are also limited to materials in the pleadings, except that courts may consider materials that are subject to judicial notice or incorporation by reference. *Heliotrope Gen., Inc. v. Ford Motor Co.*, 189 F.3d 971, 981 n.18 (9th Cir. 1999); *Khoja v. Orexigen Therapeutics*, 899 F.3d 988, 998 (9th Cir. 2018). Judgment on the pleadings is appropriate if, applying the standards articulated above, the moving party is entitled to judgment as a matter of law. *Hal Roach Studios, Inc. v. Richard Feiner & Co., Inc.*, 896 F.2d 1542, 1550 (9th Cir. 1989).

B. 35 U.S.C. § 101

Section 101 of the Patent Act provides that a patent may be obtained for “any new and useful process, machine, manufacture, or composition of matter, or any new and useful

improvement thereof.” 35 U.S.C. § 101. Although the language of the statute is broad, the Supreme Court has explained that “[l]aws of nature, natural phenomena, and abstract ideas are not patentable.” *Ass’n for Molecular Pathology v. Myriad Genetics, Inc.*, 569 U.S. 576, 589 (2013) (internal quotation marks and citation omitted). When evaluating whether claims are unpatentable under this exception, a court is required to “distinguish between patents that claim the building blocks of human ingenuity and those that integrate the building blocks into something more.” *Alice Corp. Pty. Ltd. v. CLS Bank Int’l*, 573 U.S. 208, 217 (2014). In *Alice*, the Supreme Court prescribed a two-step test for doing so. First, a court “determine[s] whether the claims at issue are directed to a patent-ineligible concept.” *Id.* Second, if the court concludes that claims are directed to patent-ineligible subject matter, it then “consider[s] the elements of each claim both individually and ‘as an ordered combination’ to determine whether the additional elements ‘transform the nature of the claim’ into a patent-eligible application.” *Id.* (quoting *Mayo Collaborative Servs. v. Prometheus Lab’ys, Inc.*, 566 U.S. 66, 78 (2012)).

The issue of “[p]atent eligibility under § 101 is a question of law that may involve underlying questions of fact.” *MyMail, Ltd. v. ooVoo, LLC*, 934 F.3d 1373, 1379 (Fed. Cir. 2019). Thus, a court may not determine patent eligibility on a Rule 12(c) motion unless “there are no factual allegations that, if taken as true, prevent resolving the eligibility question as a matter of law.” *Id.* In evaluating patent eligibility on a Rule 12(c) motion, a court also must “either adopt the non-moving party’s constructions or resolve the dispute to whatever extent is needed to conduct the § 101 analysis.” *Id.* (citing *Aatrix Software, Inc. v. Green Shades Software, Inc.*, 882 F.3d 1121, 1125 (Fed. Cir. 2018)). If the court chooses to preliminarily resolve disputes over constructions, it may do so with “less than a full, formal claim construction.” *Aatrix*, 882 F.3d at 1125 (citation omitted).

III. DISCUSSION

A. Asserted Claims

Following the PTAB’s decision to invalidate claim 13 of the ’601 Patent, UMN now asserts only claims 14 and 17 of that patent. However, because those two claims both depend on

claim 13, the Court first reproduces claim 13 below:

A method for encoding m-bit binary datawords into n-bit binary codewords in a recorded waveform, where m and n are preselected positive integers such that n is greater than m, comprising the steps of:

receiving binary datawords; and
producing sequences of n-bit codewords;
imposing a pair of constraints (j;k) on the encoded waveform;
generating no more than j consecutive transitions of said sequence in the recorded waveform such that $j \geq 2$; and
generating no more than k consecutive sample periods of said sequences without a transition in the recorded waveform.

'601 Patent at 10:47–59. Claim 14 adds the additional limitation, “wherein the consecutive transition limit is defined by the equation $2 \leq j < 10$.” *Id.* at 10:60–61. And claim 17 further narrows claim 14 by adding the limitation, “wherein the binary sequences produced by combining codewords have no more than one of j consecutive transitions from 0 to 1 and from 1 to 0 and no more than one of k+1 consecutive 0’s and k+1 consecutive 1’s when used in conjunction with the NRZ recording format.” *Id.* at 11:1–6.

B. Analysis

The Court begins with Step One of *Alice*. At Step One, courts “determine whether the claims at issue are directed to a patent-ineligible concept.” *Alice*, 573 U.S. at 217. A claim is not abstract at Step One merely because it invokes a mathematical formula. *Diamond v. Diehr*, 450 U.S. 175, 187 (1981). Rather, the fulcrum of this analysis is “the claim’s character as a whole.” *Koninklijke KPN N.V. v. Gemalto M2M GmbH*, 942 F.3d 1143, 1149 (Fed. Cir. 2019) (citation omitted). Put another way, a court must “consider the claim as a whole,” which includes “read[ing] it in light of the specification,” before deciding if it is directed towards an abstract idea or otherwise ineligible subject matter. *Packet Intel. LLC v. NetScout Sys., Inc.*, 965 F.3d 1299, 1309 (Fed. Cir. 2020) (first citing *Diamond v. Diehr*, 450 U.S. at 188; and then citing *Data Engine Techs. LLC v. Google LLC*, 906 F.3d 999, 1011 (Fed. Cir. 2018)).

There is “no [] single, succinct, usable definition or test” for what constitutes an abstract idea. *Amdocs (Isr.) Ltd. v. Openet Telecom, Inc.*, 841 F.3d 1288, 1294 (Fed. Cir. 2016); *see also Interval Licensing LLC v. AOL, Inc.*, 896 F.3d 1335, 1350 (Fed. Cir. 2018) (Plager, J., concurring

in part and dissenting in part) (“[A] search for a definition of ‘abstract ideas’ in the cases on § 101 from the Supreme Court, as well as from this court, reveals that there is no single, succinct, usable definition anywhere available.”). Nonetheless, in the context of software patents, the Federal Circuit has provided ample guidance for applying Step One. The key distinction is whether the “focus of the claim[] is on the specific asserted improvement in computer capabilities,” in which case the claim is not abstract, or if the claim focuses “on a process that qualifies as an ‘abstract idea’ for which computers are invoked merely as a tool,” in which case the claim is abstract. *Enfish, LLC v. Microsoft Corp.*, 822 F.3d 1327, 1336 (Fed. Cir. 2016); *see also Uniloc USA, Inc. v. LG Elecs. USA, Inc.*, 957 F.3d 1303, 1306 (Fed. Cir. 2020). When a claim is directed to a “technological solution to a technological problem,” it is not abstract under the *Enfish* test. *SRI Int’l, Inc. v. Cisco Sys., Inc.*, 930 F.3d 1295, 1303 (Fed. Cir. 2019).

1. *Alice* Step One

The Court concludes that LSI has failed to show it is entitled to judgment on the pleadings that claims 14 and 17 are patent ineligible. As UMN alleges in its complaint, the ’601 Patent is directed to solving a specific problem that arises when using magnetic storage devices such as HDDs. According to UMN, the presence of noise when reading data from HDDs can lead to read errors, and the amount of noise increases as HDD manufacturers seek to increase the density of data that can be stored on an HDD. FAC ¶¶ 42–45. The ’601 Patent addresses the problem of noise by preventing the presence of certain patterns of data that are particularly challenging to read, thereby reducing error and allowing manufacturers to increase storage density. *Id.* ¶¶ 47, 70–71. Taken together, these allegations show that the ’601 Patent is directed to solving the problems of noise and storage density in magnetic storage devices.

Of course, UMN cannot survive a pleading attack under § 101 by alleging that the claims of the ’601 Patent are directed to something that is not supported on the face of the patent. Even at the pleading stage, “a court need not accept as true allegations that contradict matters properly subject to judicial notice or by exhibit, such as the claims and the patent specification.” *Secured Mail Sols. LLC v. Universal Wilde, Inc.*, 873 F.3d 905, 913 (Fed. Cir. 2017) (internal quotation

marks and citation omitted) (applying Ninth Circuit law). But such contradictions do not exist here. It is true that the language of claims 14 and 17 (and claim 13, from which those claims depend) do not explicitly refer to magnetic storage of any type. '601 Patent at 10:47–61, 11:1–6. However, the claim language does use the term “waveform” four times. *Id.* And the specification suggests that the concept of a “waveform” is linked to magnetic recording¹:

Runlength limited (RLL) codes are commonly used in magnetic recording. These codes impose a (d,k) constraint on the recorded data sequence. With the Non-Return-to-Zero (NRZ) recording format, where the binary “1” represents a positive level in the **magnetization waveform** and the binary “0” negative level [sic] in the same waveform, d+1 is the minimum number of consecutive like symbols and k+1 is the maximum number of consecutive like symbols in the binary sequence.

Id. at 1:21–29 (emphasis added).

Other portions of the specification reinforce that the claims of the '601 Patent relate to magnetic storage. The specification explains that the '601 Patent “relates to a channel coding technique to improve data storage devices such as **magnetic** computer disk drives,” and that MTR code is intended to “eliminate[] certain error-prone binary data patterns from the allowable set of input data patterns that are to be recorded in the storage medium.” *Id.* at 2:40–42, 2:44–47. It also describes how “MTR code imposes a limit on the maximum number of consecutive transitions that can occur in the **written magnetization pattern in magnetic recording.**” *Id.* at 2:59–61. Moreover, the specification identifies the specific problem that the patent seeks to solve, stating that, by applying MTR coding, “the final [] error rate is improved significantly,” and the improvement in error rate “can be traded for an increase in storage density.” *Id.* at 2:47–50.

¹ This discussion of the meaning of “waveform” should not be taken as the Court’s formal claim construction of the term because, in the context of this Rule 12(c) order, the Court construes the pleadings in the light most favorable to UMN, *see Manzarek*, 519 F.3d at 1031, including to the extent it endeavors to construe terms in the '601 Patent. The Court also did not undertake a full claim construction analysis, *see Aatrix*, 882 F.3d at 1125, and in any event, the parties have not asked the Court to construe the term, “waveform.” Am. Joint Claim Construction Statement 3–4, ECF No. 240.

1 When construed in the light most favorable to UMN, these portions of the '601 Patent mirror
2 UMN's allegations.

3 Taking UMN's allegations together with the '601 Patent and construing both in the light
4 most favorable to UMN, the Court finds that claims 14 and 17 are directed to improvement of
5 computer capabilities. Namely, it finds that claims 14 and 17 are directed to reducing error
6 associated with magnetic storage of computer data and increasing storage density. Consequently,
7 the claims present a "technological solution to a technological problem," and they are not abstract
8 at Step One.

9 The Court's conclusion is bolstered by analogous case law. *See Enfish*, 822 F.3d at 1334
10 ("[B]oth this court and the Supreme Court have found it sufficient to compare claims at issue to
11 those claims already found to be directed to an abstract idea in previous cases."). For example, in
12 *California Institute of Technology v. Broadcom Ltd.*, 25 F.4th 976, 984, 988 (Fed. Cir. 2022), the
13 Federal Circuit found that a claim disclosing "[a] method of encoding signal" was patent eligible
14 under § 101. More directly on point, though, is *Carnegie Mellon University v. Marvell*
15 *Technology Group, Ltd.*, 807 F.3d 1283 (Fed. Cir. 2015). There, the Federal Circuit dealt with a
16 method claim related to ameliorating the noise present when reading data from an HDD. *Id.* at
17 1289–91. Although the claim did not introduce any physical innovations to HDDs, the court
18 nonetheless suggested that "improving a physical process by overcoming limitations in physical
19 devices[, such as] discerning more accurately what is on a physical recording medium from what a
20 read head has sensed," was not likely to raise patent eligibility concerns. *Id.* at 1297 n.3. That is
21 precisely the situation here: Claims 14 and 17 of the '601 Patent may not recite physical
22 inventions, but they are targeted to mitigating physical limitations in physical recording mediums.

23 Accordingly, the Court determines that claims 14 and 17 are not abstract.

24 2. LSI's Counterarguments

25 LSI's arguments to the contrary are not convincing. First, it argues that the claim language
26 covers "an abstract mathematical algorithm." Mot. at 11. Undoubtedly claims 14 and 17 employ
27 a mathematical formula, but that does not render them abstract. *Broadcom*, 25 F.4th at 988 (citing

Diamond, 450 U.S. at 187). As the Court explains above, claims 14 and 17 are directed to *improvements* in storage performance, not to the formula alone. Because the claims represent improvements, they claim more than just the formula and they are not abstract. *Id.*

Second, LSI suggests that claims 14 and 17 do not represent improvements because the solution that represents improvement was disclosed in the claim they depend from (claim 13), and in IPR proceedings, the PTAB found claim 13 to be anticipated (*i.e.*, not novel). LSI Suppl. Br. at 3–6. LSI confuses the issue. While courts may use similar language at times in their analysis of eligibility under § 101 and novelty under § 102, ultimately “[e]ligibility and novelty are separate inquiries.” *Two-Way Media Ltd. v. Comcast Cable Commc’ns, LLC*, 874 F.3d 1329, 1340 (Fed. Cir. 2017). To the extent courts inquire into “improvements” at Step One of the eligibility inquiry, they ask only whether a claim is a “technological solution” to a particular problem surrounding computer performance. *See Enfish*, 822 F.3d at 1336; *SRI Int’l*, 930 F.3d at 1303. If the answer is yes, the claim is such a solution, it is an “improvement” in the sense that computer capabilities are improved when the problem is solved. The novelty inquiry is different. It asks not whether a claim is a solution or not, but whether a piece of prior art proposed the *same* solution. Plainly, whether an idea is abstract should not depend on whether someone else had the idea first. As such, the Court finds that the PTAB’s decision in the IPR proceedings is irrelevant to the patent eligibility analysis here.

Third, LSI contends that UMN’s allegations show that the claims 14 and 17 are directed to an abstract idea that preempts all use of the mathematical formula referenced by the claims. Reply at 7–8. In support, LSI points to allegations that “[a]ny commercially viable implementation of MTR coding requires performance of the methods of claim 13 (Compl. ¶ 131), and that LSI’s use of “simulators” infringes (Compl. ¶¶ 20, 75, 95–98, 118–19, 122). Neither set of allegations justifies a finding of patent ineligibility as a matter of law. In isolation, the allegation that all implementations of MTR coding necessarily infringe on claim 13 might be read as preempting all use of the formula in claim 13, but as the Court explained earlier, UMN’s complaint focuses specifically on HDDs. In that context, it is clear that the allegation refers only to commercially

1 viable implementations in the HDD field. As to the set of allegations regarding the use of
 2 “simulators,” the parties dispute whether “simulators” perform only abstract simulations or if they
 3 rely on physical waveforms. *See* Opp’n at 17; Reply at 8. The pleading stage is not the
 4 appropriate vehicle for resolving such factual disputes, and nothing in the allegations bear on the
 5 meaning or function of “simulators.” As the Court must construe the allegations in favor of UMN,
 6 it finds that “simulators” are sufficiently tethered to physical waveforms that the allegations
 7 regarding those “simulators” do not imply that the claims of the ’601 Patent preempt all use of the
 8 formula they utilize. And since the Court already concluded the pleadings show that the claims
 9 are limited to magnetic storage media, the Court finds that the claims do not fully preempt all use
 10 of the formula.

11 Fourth, LSI asserts that the claims are abstract because a human could perform the claims
 12 using pen and paper. Mot. at 15. This is an instinctively appealing analogy, but it fails to
 13 persuade in the end. For one, the Court has already repeatedly rejected in this Order the notion
 14 that the claims encompass no more than a mathematical formula. It has found that, on the
 15 pleadings, claims 14 and 17 require waveforms. In turn, waveforms can only be formed by
 16 recording data on magnetic storage media. *See supra* Section III.B.1. This requirement prevents a
 17 human from being able to practice any claim with pen and paper. More fundamentally, though,
 18 the pen and paper analogy is not helpful in the context of software patents. One district court has
 19 already found the “mode of analysis [to be] unhelpful for computer inventions.” *Cal. Inst. of*
 20 *Tech. v. Hughes Commc’ns Inc.*, 59 F. Supp. 3d 974, 994 (C.D. Cal. 2014). And for good reason.
 21 As the *Hughes* court observed, software “necessarily uses algorithms to achieve its goals,” so
 22 “[p]en[-]and-paper analysis can mislead courts into ignoring [the] key fact [that] although a
 23 computer performs the same math as a human, a human cannot always achieve the same results as
 24 a computer.” *Id.* at 995. Indeed, if the pen-and-paper mode of analysis were to be viable, virtually
 25 all software patents would be abstract. Yet, the Federal Circuit has unequivocally held that
 26 “claims directed to software, as opposed to hardware, are [not] inherently abstract,” and that
 27 “[s]oftware can make non-abstract improvements to computer technology just as hardware

improvements can.” *Enfish*, 822 F.3d at 1335. Given that the consequences of adopting LSI’s pen-and-paper line of reasoning would conflict with binding precedent, the Court declines to credit this fourth argument.

Finally, LSI argues that claims 14 and 17 are abstract under *RecogniCorp, LLC v. Nintendo Co., Ltd.*, 855 F.3d 1322 (Fed. Cir. 2017). In that case, the Federal Circuit found that claims reciting “[a] method for creating a composite image” were abstract because they were “directed to the abstract idea of encoding and decoding image data.” *Id.* at 1324, 1326. This, the Circuit explained, reflected no more than “standard encoding and decoding, an abstract concept long utilized to transmit information.” *Id.* Unlike the claims in *RecogniCorp*, though, the claims here reflect more than mere encoding and decoding. They improve data storage by eliminating problematic patterns of data. The presence of improvement makes *RecogniCorp* inapposite. *See Realtime Data, LLC v. Carbonite, Inc.*, 2017 WL 4693969, at *5 (E.D. Tex. Sept. 20, 2017) (distinguishing *RecogniCorp* when the patent claims at issue did not “simply [claim] encoding and decoding,” but rather improved data compression).

* * *

Because the Court finds that the ’601 Patent is not abstract at *Alice* Step One, it does not proceed to Step Two. *Core Wireless Licensing S.A.R.L. v. LG Elecs., Inc.*, 880 F.3d 1356, 1361 (Fed. Cir. 2018) (“If the claims are directed to a patent-eligible concept, the claims satisfy § 101 and we need not proceed to the second step.”). Accordingly, the Court DENIES LSI’s motion for judgment on the pleadings.

IV. CONCLUSION

For the reasons stated above, the Court cannot conclude that the ’601 Patent is ineligible under § 101 at the pleading stage, and it DENIES LSI’s motion for judgment on the pleadings. The hearing on this motion, scheduled for August 31, 2023, is VACATED.

United States District Court
Northern District of California

IT IS SO ORDERED.

Dated: August 25, 2023



EDWARD J. DAVILA
United States District Judge